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Gas Journal

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Editor:
GEOFFREY W. BATTISON

Assistant Editor:
COLIN J. GODBOLD

Technical Editor:
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PUBLISHERS' NOTICE, SEE PAGE 194

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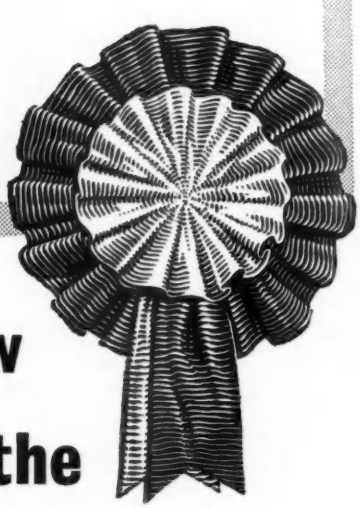

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Gas Journal

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Leeds: Cradle for gas technologists

ANY doubts we may have had about the education and training of the future engineers and scientists entering the gas industry were immediately dispelled when we visited the Houldsworth School of Applied Science at Leeds last week. As part of the University of Leeds, it houses in a well equipped, modern building the Faculties of Gas Engineering, Fuel Science, Ceramics and Metallurgy—the parent department—and also Chemical Engineering. All these are under the overall direction of Professor A. L. Roberts, the Livesey Professor of Fuel Industries.

It was, we felt, most reassuring that this great department of applied science was administered by someone connected primarily with our industry and we were particularly pleased to think that it was the gas industry which had 'started it all'. For it was at the suggestion of Sir George Livesey in the early 1900's that a proper research body was set up for the industry. It was about this time, too, that the first investigations on flames were carried out by Dr. A. Smithells which gave a lead as to which direction these researches should take.

In 1906 a department of fuel and metallurgy was set up as part of Leeds University under the directorship of Dr. W. A. Bone who had done much useful work on combustion at Owen's College in Manchester. After Sir George Livesey's death it was decided to raise funds by public subscription to endow a Chair in the University of Leeds in his memory. The Livesey Professorship was thus established and Dr. W. A. Bone became its first holder.

The gas industry was early in the field of research and the establishment of the Chair immediately extended the possibility of a thorough training in the scientific principles underlining the industry's activities, the most important of which were clearly the production and utilisation of its chief products.

We were glad that Professor Roberts made it quite clear that his department was not in any sense a technical college. It is part of a University, albeit a 'red brick' one—though the actual presence of red brick was difficult to detect—and as such deals in fundamentals and not in craftsmanship or training in the narrow sense.

Its equipment seemed to us to be excellent and was a nice combination of the familiar with the very new. In the gas testing laboratory, for instance, were to be seen the familiar Boys calorimeters, the standard gas specific gravity apparatus and the conventional equipment for measuring the sulphur content of purified gas, but also there was the very latest and most versatile chromatographic equipment with fully electronic measuring devices. The 'old fashioned' equipment is a 'must' if the student is to know exactly what he is doing and the principles on which an investigation may be carried out, but for speed and accuracy the most modern equipment is also a 'must', especially when it is realised that an untrained teenager can be taught how to use it in half an hour.

The general aim of the school then is to supply industry with properly trained 'super technologists' who have had as broad a scientific training as possible.

Perhaps at first sight the casual observer might be forgiven if he thought that although the main direction of the school was indeed under the Livesey Professor, the scope of subjects it offered was far too wide for the gas industry and would encourage even those taking a purely fuel subject to look outside it for the full use of their knowledge. There may be something in this, but Professor Roberts pointed out that the student of today is quite a different person to his counterpart of 30 years ago. Then the country was in the middle of a depression, jobs were hard to come by and competition for them was fierce. Now, however, the graduate is in demand by industry and offers for his services may be varied and diverse; the breadth of his training will give him a wider field of activity. He will want to be completely unfettered in the choice of his *first* job. (We would like to stress the word 'first' for it is unlikely to be his only job.) The graduate can find his feet during his first few years in industry; he can then decide what his bent really is and where he wants to settle.

Chemical Engineering is a popular choice for the graduate of today. It has the glamour of being thoroughly up to date; it is in fact something of a 'band wagon' on to which many ambitious young men want

to climb. Professor Roberts did not think this was such a great disadvantage to the gas industry, though he did point out that those who went straight 'into gas' almost always had some previous connection with the industry. But it was remarkable how many came to the industry later. They were then more mature and all the better for the added experience; more important still perhaps, they were ready to make it their career.

These latter were the most significant factor in assuring the technical future for the industry, for as anyone connected with gas manufacture and supply will agree, the gas industry is in an important transitional stage and is in process of being completely reorientated. The most important factor holding back its rapid expansion is the high price of its product. If this can be reduced to a figure fully competitive with oil and solid fuel, gas will be taken by industry in ever increasing quantities. For convenience in use and for the service given, gas is unbeatable and will remain so long after oil has passed from being only a fuel to become an important source of chemical raw material.

Here then is the great opportunity for the industry to offer a really interesting career to the 'super technologists' coming out year by year from the School.

What does it matter if chemical engineering is today's 'bandwagon'? The future design of gas-making plant will, we think, be based more and more on chemical engineering principles, and with the wide range of subjects demanded by gas engineering—chemistry, physics, mechanical and civil engineering—the graduate, the 'temporary' chemical engineer, will be all the more valuable to the industry.

The school not only offers honours courses in the subjects we have mentioned but also ordinary degree courses lasting three years. Such courses are of great value in that they give the less academically minded student a glimpse into the fundamentals of scientific and technological principles and provide an excellent grounding for jobs needing a complete understanding of some specific branch of industry. It is a particularly good training for anyone deciding to become a technical salesman.

If the gas industry is going to be able to take its place among the fuel industries, it must have suitably trained personnel at all levels. It must be able to call on a store of knowledge which is being daily added to by the research worker to meet the changing conditions of available raw materials, gas production and utilisation. With engineers and technologists capable of using all this available knowledge, we have no doubt that the gas industry will successfully surmount the present difficulties facing it.

A waiting game for coal?

THE present difficulties of the coal industry in Great Britain, as well as in Western Europe and in the United States, are clearly very much to the fore in the minds of those employed in 'getting' coal and selling it to the public.

To gain an insight into the changes in demand likely to be expected in the next 50 years as well as to clarify the present position, the National Union of Mineworkers organised a study conference in London recently and invited experts in their particular subjects to contribute papers to it. Altogether three papers were presented and they consisted of: 'Coal—the Next 50 Years,' by Mr. E. F. Schumacher, Economic Adviser to the National Coal Board: 'Coal—the Present Situation,' by Mr. S. Kessler, Economic Research Officer to the National Union of Mineworkers, and finally 'Coal and Science,' by Dr. D. T. A. Townend, Director-General of B.C.U.R.A.

Of these papers we have read the first two; unfortunately that by Dr. Townend is not yet available, but having listened to him on more than one occasion, we are familiar with the enthusiasm with which he puts forward the case for the development of coal as a basis for chemical synthesis as well as a refined fuel.

The impression we get from Mr. Schumacher's paper is that the coal industry must use the most carefully considered judgement in the exploitation of its resources and perhaps be prepared to play a kind of waiting game. He points out how strange it seems that the United States with its vast mineral resources and its comparatively sparse population should be so much more concerned about its future fuel demands and how they are going to be met, than we appear to be in Great Britain; in fact many of the authorities he quotes in support of his arguments are American.

Mr. Schumacher is at pains to point out that the coal industry can no longer afford to work the best seams only and when they are exhausted to abandon the mine with the possible intention of returning at some future date when the market will justify working the second and third rate coal still remaining there. Once abandoned a colliery is virtually finished, since the disturbance of the strata caused by sinking the pit and driving the tunnels, make reopening a costly and dangerous procedure. This he contrasts with a manufacturing or merchanting business with high operating costs which may be forced to shut down through bad management. At the time it might be better if it was allowed to do so, but it can be restarted at some future date with reasonable chance of success using newer methods of management. A high cost pit with reasonably good coal should, he says, be kept working as long as possible until it is exhausted. The life of a mine in an extractive industry must be reckoned in generations, not years; the time taken before a pit becomes productive should be calculated similarly and today this is generally something like ten years.

Here then we have our time base on which the long term plans for the industry should be calculated.

There can be no doubt whatsoever that fuel demands are continually rising, not only because of an increasing world population but also because of the ever rising standards of living throughout the world; the increase in urbanisation, the consequent rise in the

standard of comfort and the spread of industrialisation. But those fuels which are being used up at the greatest rate, are those of which the resources are apparently the most limited. Wherever it is discovered natural gas is immediately exploited with a notable rise in industrial activity, and the rate of increase in the use of oil is likely to absorb any world surplus there may be at present. Atomic energy is hardly likely to make any great contribution to energy supplies in less than 20 years. In the foreseeable future then it would seem that the world will fall back once again on coal for its chief source of power and energy. The price of coal will naturally rise and it is probable that its use will be restricted to such purposes as will give the best return thermally. In the same way oil products may be restricted to transport uses.

This is a long way ahead and how is the coal industry going to keep going in the meantime? Must it go forward with development schemes which can show no economic return at present for the sole advantage of the next generation? Must it continue to mine coal at the present rate to keep the collieries going and the mining communities in being with no thought of whether the coal will find a market?

Such questions are in part answered by both Mr. Schumacher and Mr. Kessler, but we feel their views are not quite conclusive.

Mr. Kessler reviews the present situation in the coal industry and makes some good points about the effects of coal price regulation in the early days of nationalisation. He shows that when fuel was scarce and supplies of coal at a premium in Western Europe, the coal industry in this country was exhorted to raise every ton it could regardless of cost but were compelled to sell it below the economic price. Vast deficits from importing coal had also to be borne by the N.C.B. to level out the price to the consumer. He complains that this has robbed the industry of any financial reserves and has made it impossible for the N.C.B. to become a commercial enterprise facing competition from fuel oil—a 'residual product.' He calls for an increase in coal consumption by those industries, such as the electrical generating industry which can gain little from burning oil, by the gas industry and other large industrial fuel users. The increase in oil imports in addition to an expansion of oil refining in Britain may well have an effect on our balance of payments if industrial activity speeds up again after the recession, so here again is further encouragement to use more coal. Increase in the efficient use of coal should do much to further its use and to encourage the clearing of the heavy stocks now standing at the collieries.

How does all this affect the gas industry? Coal is still the basic raw material for gas making though there has been an increased use of oil by the industry, but processes in the laboratory point to an expansion of the use of coal. Any increase in coal price will clearly affect the industry adversely but this may be offset by processes avoiding a solid residue. We feel, however, that if coal comes into its own again in 30 or 40 years time, it will need our industry to process it before it really becomes acceptable. It is probable that with other raw materials open to it, the gas industry will find it easier than the coal industry to play its waiting game.

97th Annual General Meeting of the I.G.E. —programme

THE 97th annual general meeting of the Institution of Gas Engineers will be held in Edinburgh on May 31, June 1, 2 and 3 under the presidency of Mr. D. D. Melvin, Member, Scottish Gas Board. The following is the programme of events:

TUESDAY, MAY 31.

9.15 a.m.—Civic welcome by the Lord Provost; opening of the meeting; welcome to overseas representatives; adoption of the report and accounts; scrutineers' reports of the ballots; presentation of medals.

10 a.m.—Presidential address by D. D. Melvin.

10.45 a.m. to 11 a.m.—Annual general meeting of contributors to the benevolent fund of the I.G.E.

11 a.m. to 12 noon.—Presentation and discussion of 'The Westfield High-Pressure Coal-gasification Plant,' by T. S. Ricketts.

12.15 p.m. for 12.45 p.m.—President's luncheon at the North British Hotel (by invitation).

3 p.m. to 5 p.m.—Civic garden party given by the Lord Provost, Magistrates and Council of the City of Edinburgh within the grounds of Lauriston Castle. (Lounge suits).

8.30 p.m. to 1.30 a.m.—Reception and dance in the Music Hall and Assembly Rooms, George Street (evening or dinner dress; decorations).

WEDNESDAY, JUNE 1.

9.15 a.m. to 10.15 a.m.—Presentation and discussion of 'Gasification at the Isle of Grain,' by C. Stott, M.C.

10.15 a.m. to 11.15 a.m.—Presentation and discussion of 'The Architect and the Gas Engineer,' by R. Baden Hellard.

11.15 a.m. to 12.15 p.m.—Presentation and discussion of 'The Development of the Industrial Gas Load in Scotland,' by A. Higgs.

Visits in the afternoon to the Westfield Works of the Scottish Gas Board; to the Granton Works of the Scottish Gas Board; to the research and development centre and the Dury Foundry of Henry Balfour & Co. Ltd., Leven; to the BP refinery (Grangemouth) Ltd.; to the Gothic Works, Falkirk, of R. & A. Main Ltd.; to the Clydesdale Steel and Tube Works, Bellshill, of Stewarts & Lloyds, Ltd., and a ladies' motor coach tour of Edinburgh and tea with knitwear display.

THURSDAY, JUNE 2.

9.15 a.m. to 10.15 a.m.—Presentation and discussion of 'Coke in a Changing Market,' by D. G. Rose and F. A. Burden.

10.15 a.m. to 11.15 a.m.—Presentation and discussion of 'White Lund—Some Aspects of a New Works,' by F. C. Buckley.

11.15 a.m. to 12.15 p.m.—Presentation and discussion of 'Live Gas,' by Stirling Everard, M.B.E.

12.15 p.m. to 12.30 pm.—Concluding business of meeting.

12.45 p.m.—Council luncheon to the president.

Visits in the afternoon to the Westfield Works of the Scottish Gas Board; to the Granton Works of the Scottish Gas Board; to Gothic Works, Falkirk, of R. & A. Main, Ltd.; to the British Tube Works, Coatbridge, of Stewarts & Lloyds, Ltd.; to Burtons Gold Medal Biscuits, Ltd., Edinburgh; to the Works of Ferranti, Ltd., Edinburgh, and a ladies' tour, by motor coach, of the Border Country.

FRIDAY, JUNE 3.

Tour of Loch Lomond and the Trossachs.

THE PROBLEM OF GAS LOSSES--SOME PRACTICAL CONSIDERATIONS

By

G. Gutte

GAS loss is defined as the difference between the amount of gas produced and the amount of gas supplied. Gas supplied contains the proved and estimated amounts for internal consumption, gas street lighting, and similar fixed items. The amount of gas stored in the low-pressure gas system does not affect the loss determination, because the original amount of gas in the pipe-lines is taken into account when they are put into operation.

For long-distance gas supply systems, the gas loss is calculated as the difference between the amount of gas taken over as measured and the amount supplied, estimated fixed amounts being again taken into consideration. But the storage capacity of the system must then be evaluated in assessing loss, because pressure fluctuations lead to considerable mass displacements in the pipe system.

Quantative determinations of gas are greatly influenced by its temperature. Pressure changes in low-pressure gas supply systems and changes in the water content of the gas have less effect. Measuring instruments for temperature and pressure must be checked regularly for accuracy to eliminate measuring errors in the determination of the critical value of gas losses.

A change of 1% as the result of gas loss measurement will be produced (a) by temperature changes in the gas of 2.73°C, (b) by pressure changes of 7.6 mm.Hg. and (c) by changes in the moisture content of the gas of 80 g. per cu.m. Changes in atmospheric pressure need not be taken into account in local gas supply systems, because they affect all measuring systems equally. Factors such as benzole scrubbing with impregnation agents in the pipe system or naphthalene segregation, and chemical changes in the gas due to oxygen absorption by the heavy hydrocarbons, need not be taken into account in the determination of losses even in systems operating at higher pressures, because their quantitative effect is negligible.

In order to eliminate apparent losses introduced into the calculation by changes in the state of the gas, the gas supplied must be expressed in terms of standard conditions at all measuring points. It must be established whether the total amount of gas supplied is converted to standard cu.m.—at 0°C. and 760 mm.Hg.—or whether the basis of calculation is the operating condition in cu.m.—at 15°C., at the average local barometric pressure and moist. On passing through the pipes in the ground the gas rapidly assumes the temperatures of the soil. This process is determined by the load on pipe cross-sections. Soil temperatures can be determined by direct measurement.

On passing through the pipes in buildings some of the gas is slightly heated. Gas temperatures at the individual consumers' metering points correspond to the soil temperature plus some slight heating, previously reckoned at 1-3°C. The soil temperature is not constant over the whole of the 12 months' period.

The curve in Fig. 1 illustrates the differences in the soil temperature througout the year. The geographical position of the various measuring points plays an important part and that for Fig. 1 is in Silesia, close to the Riesengebirge mountains.

The annual average soil temperature is about 10.4°C. (50.7°F.). Taking into account the assumed heating of 3°C. due to passage through pipes in buildings, it will be found that the standard of 15°C. (59°F.) accepted for practical purposes can only be an assumed temperature value.

The readings recorded by the measuring instruments at the production or supply points must therefore be converted into the standard conditions mentioned above for loss determinations. In the absence of such conversion the determination of loss is incorrect and will result in incorrect operational measures. For example a drop of 2.7°C. in the temperature of the gas between the supply point and the sales point of measurement shows an apparent gas loss

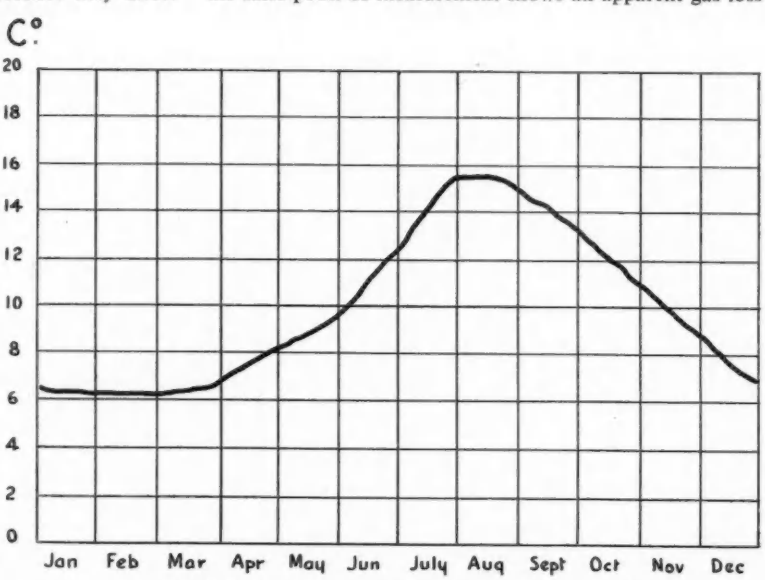


Fig. 1. Soil temperatures at a depth of 1.2 m. in 1937.

of 1%. If the difference in the temperature of the gas between the supply point and the sales point is 10°C., the apparent loss will be above 3%, which may result in labour being used to eliminate the loss which is bound to be futile since the loss is only apparent.

Conversely, the amounts of gas measured in the event of increases of temperature between supply point and sales point might in some circumstances be so considerable that the true gas losses could not be recognised. In fact, if increases in temperature were neglected, measures to eliminate gas losses which would have brought about considerable savings, would not have been taken.

An exact determination of loss for shorter accounting periods is practically impossible, because it is impracticable to take readings simultaneously at the supply point and the sales point. This procedure is practicable for individual large consumers. The time-lag between the meter-reading periods leads to differences which greatly affect losses in the short run, but cancel out in the long run. For example, if the reading difference for one month is 1,000 cu.m., its effect on the loss, at a monthly supply of 10,000 cum., will be ±10%. Reckoned in terms of a year's suppy of 120,000 cu.m. the same difference in the readings will have an effect on the loss of ±.83%. Such differences in readings are due to the irregular distribution of Sundays and holidays over the months.

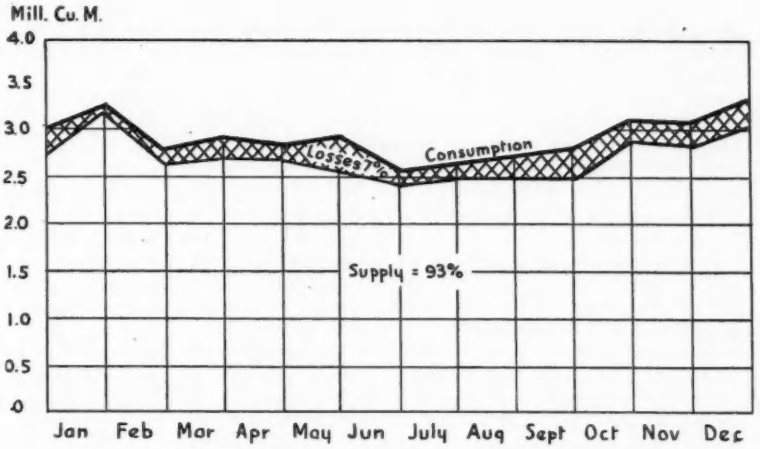


Fig. 2. Gas supply, gas consumption and gas losses in 1957.

Preconditions for an accurate determination of loss is that the meters at the points of supply and at the points of sale should record correctly. The abnormal conditions of measurement for sales purposes are known and have already been explained, but it would appear to be necessary to examine the errors which may beset measurement at the supply point.

For dry measuring apparatus these are:—Unfavourable load, dirt in the meters and diaphragms, faulty thermometers and pressure gauges, changes in the composition and specific gravity of the gas—particularly in diaphragm metering—worn rotary pistons or housings.

For wet gas meters the errors are: Leaking cylinders, misadjusted water overflow pipes and excessive water feed, the crooked position of meters, faulty thermometers, reduction of cylinder volume due to worn bearings and bent shafts, leaking by-passes on the wet counters.

Errors in measurement common to both types of meter are: Benzole scrubbing installations in the gas stream behind the supply measuring points which result in a change in volume quite apart from the change in calorific value due to benzole scrubbing, and unrecorded gas points for internal consumption connected up behind the supply measuring point.

Mass correction needed

In gas production and at supply points gas is usually measured at the pressure established by the subsequent holders. For correct loss determination, a mass correction is required in this case, because gas losses of 2 to 3% may be concealed under the various pressures between supply point—long distance gas supply point or gasholder outlet—and the consumer's gas meter. The true gas loss must be calculated from the difference between supply and sale as determined with accurate measuring instruments under conversion to standard conditions.

Fig. 2 shows all gas losses in an area under observation. In the absence of measuring instruments it was impossible to determine independently the amounts of gas carried in high-pressure, medium-pressure, and low-pressure systems. The evaluation of the gas losses is therefore very difficult. The method of recording pressures and gas temperatures in the high-pressure gas supply stations according to which accounting and/or conversion of the amounts of gas supplied in the district concerned was carried out, appears dubious. Gas temperatures at three high-pressure gas supply stations were therefore recorded, such as have in the past been taken into account in conversion to the standard volume.

Comparison of the temperatures at three supply stations with those in Fig. 1 confirms the remarks already made, particularly since the measuring points are situated at heated transfer stations. About 8 mill. cu.m. of gas are supplied per annum over the high-pressure system. Thus, if the gas pressures and temperatures over a 12 months' period are not determined correctly, gas losses for the system amount at 1% to 80,000 cu.m. and at 2% to 160,000 cu.m. per annum. At an average sales price of DM 14 per cu.m. this amounts to 1,120 and 2,240 DM, respectively, which could be recovered by applying accurate methods of measuring.*. These remarks provide grounds for keeping all measuring points under stringent and regular control.

Sources of loss

Since it is impossible to make an immediate estimate of losses, the individual sources of loss must be listed and classified very carefully. The following factors may be involved:

1. Pure pipe-line losses due to gas leaks in pipe-lines and distribution installations carrying unmetered gas.
2. Losses in gas storage installations.
3. Faulty gas meters.
4. Gas theft.
5. Gas consumption for street lighting and accounting for it at a fixed rate.
6. Fixed rate supplies.
7. Meter-reading time-lag.
8. Changes in the condition of the gas.
9. Condensation.
10. Gas losses during work on pipe-lines and distribution installations carrying unmetered gas. (Pressure reduction for repair work.)

* 1 DM = 100 pfennig, 11.75 DM = £1.

This list of gas losses shows that those under categories Nos. 1 and 2 are so-called true losses; those under Nos. 3 to 9 are apparent losses. Losses under category 10 can also be considered as true losses unless they are specially taken into account and are booked under operating expenditure. In the interests of a correct loss account these losses should be booked as operating expenses, or the amounts in excess or falling short should be specially accounted for.

To permit an economical evaluation of gas losses to be carried out and to obtain an indication as to whether they can be avoided or must be accepted because of inevitable technical deficiencies, bases of comparison are desirable. The general practice of expressing gas losses in percentages provides no suitable data. Comparative figures should take into account the length of the pipe-line and perhaps its load. In the case of inevitable gas losses for a supply of 2,000 cu.m. over 24 hours, the losses according to the customary method of calculation for a daily throughput of 10,000 cu.m. are about 20%. This high figure suggests that funds should be made available to eliminate loss, even if no economic profit is involved. The recording of gas losses in cu.m. per km. length of pipe-line and unit of time is far more suitable for purposes of comparison, but the effects of gas meter losses are not taken into account. In order to take gas meter losses in the supply area into account, we can use the following formula:

$$X = L. \frac{V}{\frac{M}{1{,}000}}$$

Where V = the loss in cu.m. per day, L = the length of pipe-line in km. including service connections and M/1,000=the number of gas meters connected up; 1,000 = the meter unit.

Empirical data are available for the unavoidable losses taking the length of pipe-line into account and using such data as a guide. The data for welded steel pipe-lines fluctuate between 2 and 4 cu.m. per km. a day depending on the age of the pipes; for cast-iron pipes with sleeve joints they fluctuate between 4 and 6 cu.m. per km. a day, again depending on the age. The unavoidable loss can be determined by means of these data for the supply area and length of pipe-line concerned, and the number of the gas meters connected. The determined value as compared with the calculated actual loss-difference value indicates the magnitude of the losses that can be recovered by repairs.

Prolonged timings

In making an assessment of the expenditure on labour to eliminate gas loss it must be borne in mind that the elimination of sources of loss will be effective for several years—six to eight years on average. To facilitate evaluation of gas losses it is advisable to record them over a prolonged period of time.

Fig. 3 shows gas losses over the last 18 years and some important conclusions can be drawn from it for the supply area considered. If the occurrence of major losses is compared with the repair diagrams and pipe-line diagrams for the appropriate dates, it will be seen that there is a possibility in some cases of identifying losses and eliminating them more quickly.

The price per cu.m. of gas losses saved is reckoned to be the average sales price. This average sales price should be used for avoidable gas losses caused by faulty gas meters, erroneous consumption figures for street lighting, fixed-rate supplies, and thefts of gas.

For so-called mixed operation, i.e., internal production and long-distance gas supply, costs per cu.m. gas loss are determined as the corresponding savings obtainable if the gas losses were eliminated. Depending on local conditions this may be either the price of the gas as supplied or even the cost of the gas as produced, in the event of minimum-consumption agreements it would be a mixed price computed from the supply price and the production costs.

An approximate separation of respective gas losses from pipe-lines and gas meters is desirable and can be achieved by carrying out metering at night. For this purpose, all consumer points including pilot lights are turned off by proclamation during the hours of midnight to 4 a.m. The amount of gas fed into the system under constant pressure during this period is the amount on which the calculation of pipe-line losses should be based. It is advisable to record the amount of gas supplied to any local system for these measurements by means of temporarily installed dry gas meters in order to eliminate the influence of temperature due to wet gasholders or wet gas meters from the start. The difference between the loss as determined by these night-time measurements and the total actual loss represents the contribution of meter losses.

In the case of large supply areas the pipe-line losses

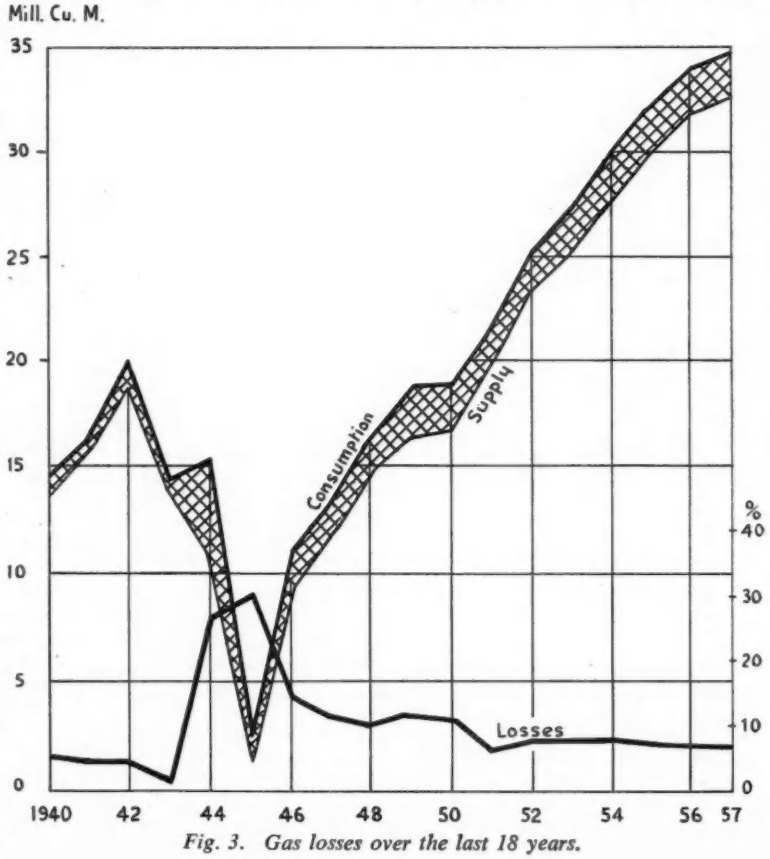


Fig. 3. Gas losses over the last 18 years.

can be determined by the use of so-called bubble barriers in the pipe-lines and by by-passing a barrier with an auxiliary pipe-line and gas meters, after cutting off consumers in the area. Such division into areas then provides the sequence of the necessary operations to eliminate losses.

Pipe-line losses are identified by drilling and testing the soil by means of apparatus working on the diffusion principle. Odour tests are unsuitable for the identification of minor pipe-line losses because the smell of benzole can easily be confused with that of gas and various types of soil may make the gas practically odourless as it passes through it. To trace gas losses by odour testing the gas can be injected with chemicals such as mercaptan. This procedure is suitable for sections of high-pressure pipe-line passing through open country.

In drilling work, gas samples are not only taken from gas mains and domestic pipe-lines; the adjacent conduits, locks, cable troughs, drains in the proximity of domestic supply pipes, street lamps and their gas supply lines must also be tested. Particularly weak points in the mains supply system, especially in the case of old installations, are the standpipes and blow-off pipes of water and dust traps. Gas leaks discovered in drilling operations must be accurately located to avoid expensive excavation work. The leaks found must be recorded on plans giving exact dimensions, and, if necessary, the leaks must be recorded on a general plan to enable a programme for excavation work to be drawn up.

The advisability of individual municipal gasworks paying a bonus for reports of gas odour emissions leading to successful leak detection should be considered.

The sleeve connections of cast-iron pipes are known to be a constant source of loss, particularly at street crossings carrying heavy goods traffic. Recaulking of these sleeves is no effective remedy because of the constant soil vibration. The installation of rubber strips previously dipped in benzole between the hemp packing and the lead lining has proved satisfactory in such cases. The installation of rubber strips by themselves without the hemp or tarred packing is unsatisfactory because the rubber may swell, penetrate the sleeve, and restrict the cross-section of the pipe-line. Steel sleeves are best sealed by inserting iron rings and welding them or welding on so-called Kiel caps.

Rapidly-mounting losses

On conversion from local production to long-distance gas supply, or even on installing benzole production plants in local supply systems, gas losses may greatly increase, particularly in old systems. The gas in such cases absorbs naphthalene and oil deposits from the pipes and dries out the seals. As it is usually impossible to eliminate these rapidly-mounting losses by resealing the sleeves as a short-term measure, the gas will have to be enriched with the substances which it would otherwise absorb from the pipe-lines. The last runnings of the benzole plant, which contain naphthalene, are best suited for the purpose. The fine naphthalene segregations have a scrubbing effect on the oil deposits in the gas in the pipe-lines. This gas enrichment reduces the absorption of substances from the pipe-line. The evaporation or atomisation of oil in the gas is only successful within limits because the oil injected is re-deposited in the pipe-line as the gas temperatures are reduced to the soil temperature. Only traces of the oil remain in the gas unless changes in temperature occur or substances are present in the pipe-line that affect the vapour pressure.

If the gas storage space is insufficient and the holders are overcharged, or heat compensation for solar radiation is neglected, considerable gas losses may be caused by gas discharge. This can be remedied by efficient staff, if necessary by the installation of warning devices operating both an audible and a visual signal. Gasholders with an automatic cut-off may cause great gas losses by discharge in high winds when the operating levers are displaced or when the operating mechanism ices up. Gasholder installations must be inspected regularly. All liquid seals should be checked as well as the holder surface, the lift wall and the crown. An old rule of thumb for checking the lifts for gasholders is the close observation of the lift wall on dipping into the sealing liquid and the observation of the crown when it rains.

Faulty gas meters

The use of gas meters irrespective of the peculiarities of design in itself frequently causes loss. For example, in the case of rotary piston gas meters and helical gear gas meters, considerable gas losses may result if the size of the meters is unsuitable for the quantities of gas involved. Industrial gas meters will work accurately within relatively narrow limits only. For measuring large amounts of gas, the time and amount of supply must be considered. Consumers receiving large quantities per hour for a few hours during the day only and whose gas requirements, for the rest of the time, are less than 10% of the maximum, require more than one gas meter because a large gas meter will not record small amounts of less than 10% of its maximum load—because of slip losses. In such cases, a second gas meter should be installed with a maximum capacity of 10% of that of the main meter. The small meter is connected in parallel with the large one. A reversing valve is installed in front of both meters.

The gas consumption of street lighting systems as determined in the laboratory does not always tally with the amount of gas consumed in practice. A street lamp and pilot light erected in a laboratory will be subject to breakdowns under the effect of wind and weather when it is installed in the street. Service staff therefore are likely to carry out adjustments to eliminate or avoid such breakdowns which mean increased gas consumption of the lamp and the pilot, so it is advisable to install meters for the accurate determination of gas consumption by street lamps. Such measurements have shown that the actual consumption exceeded the scheduled consumption by as much as 30%. Further sources of gas loss in street lighting are neglect of lighting-up times and failure of igniting mechanisms.

Work on pipe-lines

Gas lost during work on pipe-lines and distribution installations carrying un-metered gas can be avoided almost completely if the operating sequence for such work is properly worked out in advance. To complete the discussion of factors concerned in drawing up a loss balance, losses caused by the blowing out of dust from high-pressure lines should be mentioned. The men in charge of this work frequently permit larger amounts of gas to escape from the high-pressure pipe-line than are necessary to remove the dust. It is worth while measuring the amounts of gas discharged in a given space of time by entering blow-out pressures, cross-sections and times in a ledger and computing the amount of gas. The value of this gas should be debited to the ' operational expenditure ' budget.

Constant loss detection

If a comparison between the savings in gas losses, and the cost of eliminating these loses should show that they are about equal, measures to eliminate loss must nevertheless be carried out constantly. Constant loss detection and elimination enables those responsible for the direction of gas supply undertakings conscientiously to fulfil the duty with which they are charged.

Efficiency as important now as in post-war crisis

EXHIBITION PROMISES GREATER ECONOMY IN FUEL USAGE

WHEN fuel efficiency first became a matter of urgency the compelling reason was the shortage of fuel which characterised the years after the war. Although these conditions no longer prevail, the need for fuel efficiency is just as vital today in order to keep production costs to a minimum at a time when competition, both in domestic and export markets, is keener than ever before.

The acuteness of this question gives great significance to the Fuel Efficiency and Power for Industry Exhibition at Olympia until May 6. As is usual at this type of exhibition, the important rôle which gas plays in the field of fuel efficiency is clearly in evidence, and many well-known firms display their latest equipment designed to add still further to the efficiency of gas-fired equipment.

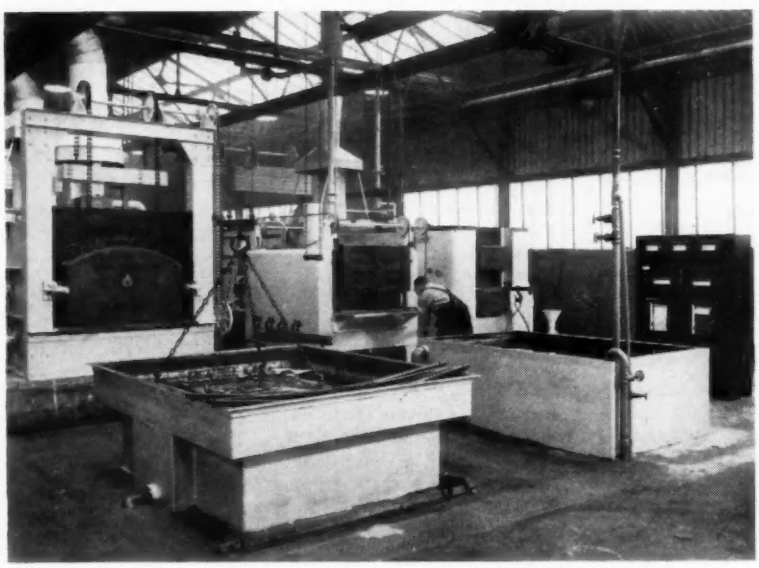
In addition to the individual manufacturers of gas-fired appliances and ancillary equipment, a number of important institutions and organisations have stands, including the Gas Council, the British Iron and Steel Federation, the Combustion Engineers' Association, the National Coal Board, the Institute of Fuel, and the National Industrial Fuel Efficiency Service.

A series of technical meetings under the general title 'The Selection of Fuel-using Equipment and Power Plant' was arranged by a committee which was convened by the Institute of Fuel and on which the Institution of Gas Engineers and the Society of British Gas Industries were represented. Among the papers being presented are 'Heat Transfer' by Mr. R. F. Hayman (Industrial Gas Officer, the Gas Council) and 'Heat Recovery' by F. H. Newman (Senior Economisers Ltd.).

One of the most impressive of the exhibits is the **Gas Council's** stand, which comprises a heat treatment shop actually engaged on part of the work schedule transferred from the Birmingham heat treatment shop of the West Midlands Gas Board, whose operations were described in 'GAS IN INDUSTRY' a short time ago.

Working equipment on display includes a bright annealing furnace by the **Incandescent Heat Co. Ltd.,** a high-temperature oven by **Thermic Equipment & Engineering Ltd.,** a tempering oven by **J.L.S. Engineering Co. Ltd.,** as well as other ancillary equipment, such as hardening and tempering salt baths, water and oil quench tanks and a hardness testing machine.

This, of course, represents only a small proportion of the equipment at the West Midlands Gas Board Adderley Street centre, which has 22 furnaces altogether, including a gas-fired gas carburising furnace which is one of the first of its kind to be installed in the Midlands. Some of this equipment, which is too large to be transferred to the Exhibition, is displayed in model form in a lounge above the stand.



One of the most impressive features of the Fuel Efficiency Exhibition is the heat treatment shop in action, which forms the Gas Council's display. The equipment is actually engaged on work from the West Midlands Gas Board's heat treatment centre in Adderley Street, Birmingham. In this picture of part of the Birmingham centre, small furnaces for general heat treatment are shown.

Many different types of boilers are on show, ranging from smaller models suitable for domestic use to huge installations required in the power industries. It would perhaps be fair comment to suggest that the gas-fired boiler appears to receive rather less than its due share of the limelight at the Exhibition. This is the more surprising since firms who are exhibiting gas-fired boilers, particularly in the domestic field, are able to report a strengthening of interest in such boilers in recent times.

One exhibitor who produces both gas- and oil-fired domestic boilers explained that potential customers who come along with no previous thought of purchasing a gas-fired boiler are often prepared to take one into consideration. Economics are not the only consideration, for improvements in the design of gas-fired

Boilers, particularly in respect of the amount of space occupied in kitchens or other apartments, are important to the modern householder. Greater flexibility and ease of control are other important features.

A good example of this is on the stand of **Thomas Potterton Ltd.,** where three boilers from the well-known Diplomat series are shown. Main interest naturally centres on the newcomer to the series, the Diplomat 31, which is a redesign of the Diplomat 30. One result of the redesign is that the front-to-back dimensions have been reduced by 5 in. so that the new boiler can be fitted in even smaller spaces in the kitchen than before.

All boilers in the Diplomat series now have the glass-coated finish on the flue-ways which makes cleaning easier, reduces corrosion and reduces the frequency of service visits.

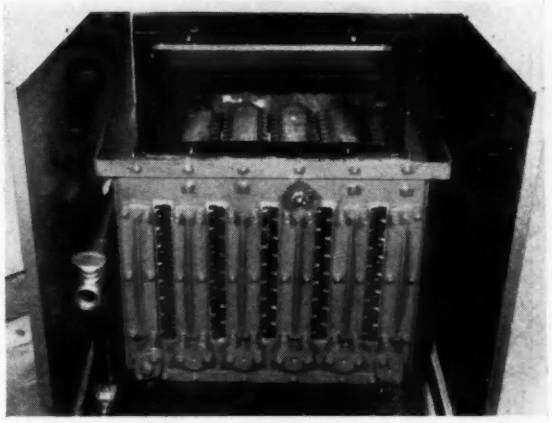
Steam and hot water for industry is widely supplied by gas-fired equipment of the type shown at the Exhibition by **G.W.B. Furnaces Ltd.,** whose Powermaster packaged automatic boiler is in use on these duties both in Britain and overseas. When gas-fired, these boilers are fitted with the Voriflow burner which is of the pre-mix design. Gas flows through the central gas nozzle from the gas plenum, while combustion air from the blower simultaneously enters the air plenum automatically controlled by a motor-operated damper. Primary pre-mixing air is captured by a stationary air-wheel register which directs the pre-mixing air through holes into the gas nozzle against venturi-shaped air baffles. The air and gas are thoroughly mixed passing through the gas nozzle and the outer secondary air ring controls the amount of secondary combustion air admitted to the combustion chamber. Ignition takes place at this point.

Gas-fired Powermaster boilers are available with ratings up to 3,450 lb. of steam per hour (3,347,000 B.t.u. per hour).

Gas- or oil-fired Redfyre corner tube boilers manufactured by **Newton Chambers & Co. Ltd.** possess several important advantages, including quick steaming and reaction to load conditions and higher boiler efficiency. Because of its design the corner tube boiler is particularly recommended where there are considerable variations in load conditions.

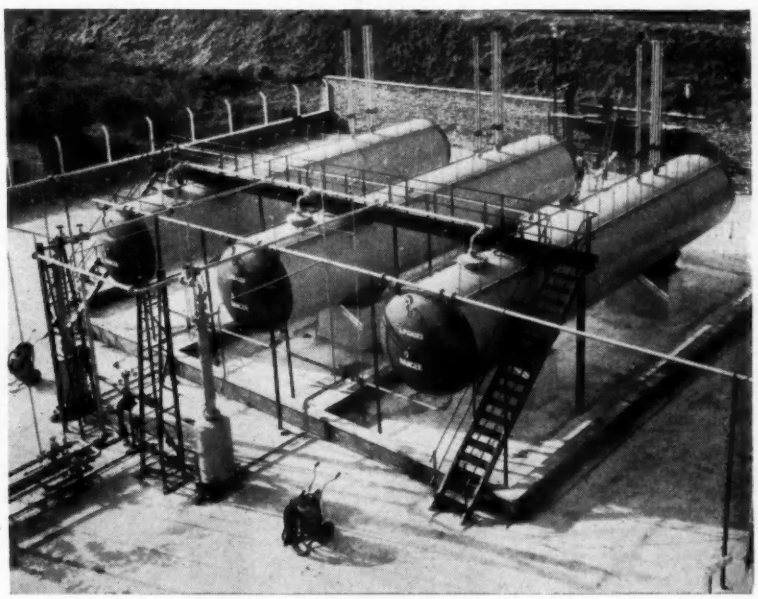
Technical difficulties have prevented many firms from showing the larger gas-fired equipment they would otherwise display. **Drakes of Halifax Ltd.,** however, show a working model of a gas-fired rotary melting furnace and also a model of an activated kiln. The compact design of these two pieces of equipment makes them particularly suitable for the purposes for which they are designed. Another interesting item on this stand is the Drake-Didier-Kogag gas-fired cremator. This has been designed with a special eye for economy in gas consumption, particularly where there is a continuous throughput of charges.

Of the various types of burner equipment on show, some of the most interesting types are the combination oil/gas burners. An example is the combined oil/gas burner seen on the stand of **Spencer-Bonecourt-Clarkson Ltd.,** a subsidiary of Babcock & Wilcox Ltd. This burner is designed for application to the well-known Steambloc automatic, packaged boiler which supplies steam for power, processing or heating purposes. Suitable for burning gas or oil only or for firing with both fuels simultaneously, the combination burner is neatly designed and simple in operation.

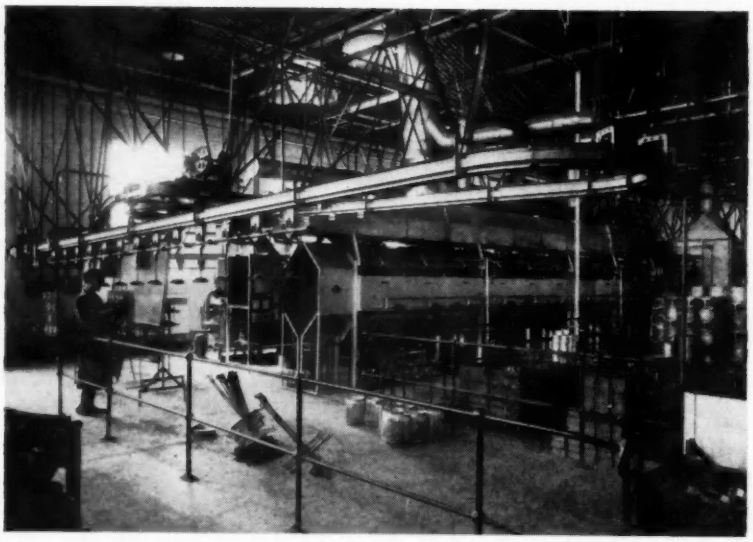


A Diplomat 250 gas-fired boiler showing the studded vertical flue-ways. These flue-ways are now glass-coated in order to make cleaning easier, reduce corrosion and also reduce the frequency of service visits.

Burners of various types are shown by a number of firms at the Exhibition, both as separate exhibits and fitted to gas-fired equipment. Special mention should be made of the new air-blast tunnel burner shown by **Keith Blackman Ltd.,** comprising injector and burner cast in one piece. This is the result of initial research by the Gas Council at its Midlands Research Station and subsequent development work by the Gas Council and by the Keith Blackman industrial gas research department.



Liquefied petroleum gas plant by W. C. Holmes & Co. Ltd. installed at the Grangetown works, Cardiff of the Wales Gas Board for the purpose of augmenting town gas. The installation includes storage vessels, vaporisers and ancillary equipment.



A sixty-panel oven being used for the stoving of various die-castings at the works of B.T.H., Rugby. The stoving time is approximately 6/7 minutes.

The new tunnel burner has been designed to achieve speedier combustion and higher temperatures with accurate control in the furnace. It is particularly suited to high-speed localised heating purposes such as the treatment of bars and plates. The gas-air mixture is delivered to the burner by an injector incorporating modifications the results of which have been extremely effective in tests. The injector is fitted with air and gas connections and a gas adjuster ensures the correct mixture at the burner orifice. The KB air blast tunnel burner is the latest addition to the Keith Blackman range of air-blast equipment, which includes other types of air-blast burner, mixture controllers, zero governors and air-blast injectors.

Infra-red forms of heating have in recent years brought about considerable improvements in such industrial applications as paint drying and stoving, vitreous enamelling, curing and pre-heating. This was well illustrated by actual working examples at the recent Gas at Work in Industry Exhibitions in London and Harrogate. Leading firms in this field are present at Olympia, including **Parkinson Cowan Industrial Products Ltd.,** who illustrate their well-known radiant heat panel units by a series of striking photographs of installations in different industries. These include a 78-panel unit employed on stoving washing machine bodies in a process time of eight minutes and a 48-panel unit stoving accounting machine cases in ten minutes.

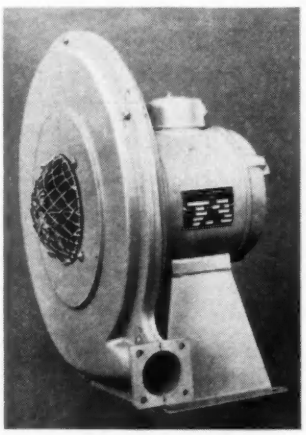
Parkinson - Schwank gas radiant heaters are, of course, installed in many factories, offices and other installations, and although only a few of the heaters on the Parkinson Cowan stand are switched on, the effect can be felt as soon as the visitor comes within range. Special interest is aroused in the radio-controlled panel and in the wall-mounted models. This is an interesting trend and, as compared with the more usual roof-mounted types, they are easier and cheaper to instal and maintain. Despite the lower fixing height, the new range is designed to give the same intensity of radiation at floor level. It is suggested that the heaters can be suspended by chain or fixed by brackets on the wall or under a gantry crane rail.

Gas-fired infra-red radiant heaters for all space heating purposes are shown at Olympia by **Harris Engineering Co. Ltd.** These Harris/Schwank burners are embodied in heaters suitable for horizontal or wall mounting and may be installed at heights of up to 60 ft. The same company also features their range of gas unit heaters, with or without flues, providing heat with automatic controls in commercial and industrial buildings. There are eight models altogether, including five direct-fired and three indirect-fired types which between them cover a wide range of duties. Robustly constructed and designed with space-saving in mind, these heaters are fitted with full controls, including thermostat and all safety devices.

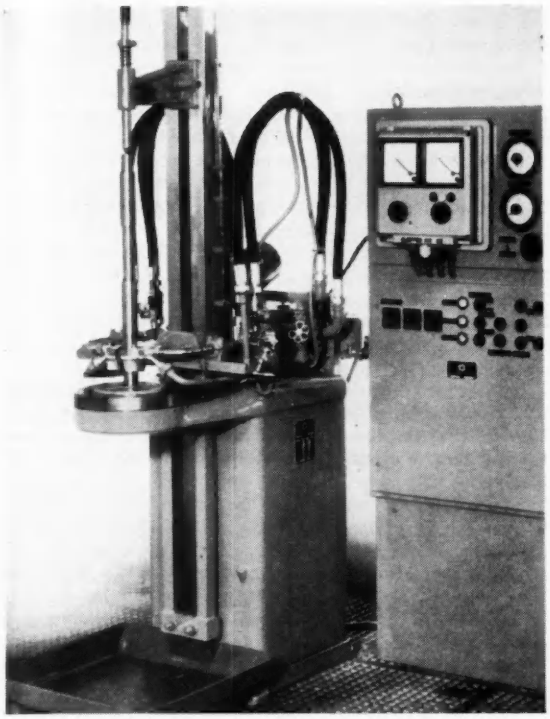
Several observers have remarked on the number of oil-fired domestic and commercial heaters on show at Olympia and all concerned in the gas industry are fully aware of the stern competition offered by this form of heating. On the other hand, some prominent exhibitors are well pleased with the progress being made by the gas-fired appliance.

Many firms have shown themselves aware of the position by making their equipment available in both oil- and gas-fired forms. **Rubery, Owen (Heating) Ltd.,** for instance, offer their Rubery-Owen-Greaves heaters as both oil- and gas-heated. These heaters are supplied in three main forms, respectively for industrial, domestic and portable applications. The industrial heaters are supplied in a range from 150,000 to 1½ mill. B.t.u. per hour, while the domestic heaters, using lower air velocities than the industrial range, are most suitable for public buildings or the larger type of house.

It is never easy for the organisers and exhibitors at a specialised exhibition of this nature to decide exactly what emphasis to place on the various aspects of the problem. The title 'Fuel Efficiency' suggests that the aim of the Exhibition is to show the consumer not so much which particular fuel he should use but how to make the best use of whatever fuel he happens to be using in the particular application. For this reason, although there are plenty of boilers, furnaces, heating appliances of all kinds and different types of burners, some of the most interesting equipment at the Exhibition was that de-



Left: *A Tornado N.00 cast iron blower, direct-driven by a Keith Blackman motor, for air supply to furnaces and similar duties.* **Above:** *The K.B. tunnel burner.*



Typical of the many applications of gas in heat treatment is the Peddinghaus fully automatic oxy/town gas shaft hardening machine with a pre-determined programme to harden pre-selected portions of the shaft. Surfard Ltd. are the suppliers.

voted to the more effective operation and control of what may be termed the basic equipment.

Ancillary equipment ranges from flame failure devices, air filters, dust arresters and removers to economisers and heat exchangers, insulation materials and methods and improved refractories. So far as devices are concerned, the trend is towards improved performance with a greater degree of automatic operation, while the new materials are designed to give longer life at the heavier duties demanded under modern conditions.

In the sphere of heating, this point is emphasised by Mr. David Richards, Manager of heating control equipment sales at Honeywell Controls, who has said: 'The arrival of clock thermostats, indoor-outdoor control schemes and multi-function boiler controls, is going to increase the heating engineer's profit and his turnover. . . . One of the new pieces of equipment on the Honeywell stand is the electric clock thermostat which is not only an elegant piece of equipment in its own right but provides a controlled temperature in the home and saves fuel costs. Another interesting exhibit on the Honeywell Controls Ltd. stand is the Ultra-Vision flame detector designed for use with rectification-type flame safeguards. Ultra-Vision is sensitive to ultra-violet light only, will sense only 'genuine' flames and electric sparks, and can be used with both gas and oil burners. The effectiveness of this equipment is well displayed, the equipment being clearly shown to be unaffected by a beam from an electric torch.

Among several innovations on the **Perl Controls Ltd.** stand is the Type No. 90 Perlontronic instant flame protection set. Its main feature is its price, for which it provides the improved protection in circumstances where initial cost has hitherto dictated the use of thermo-electric controls. The system consists of three units, namely, the pilot burner, with flame sensing probes, the amplifier unit and a low voltage control unit. It is easy to install and maintain and, since it only operates on the passage of the current through a pilot flame it can only fail to safety should a fault occur.

Another new item on the Perl Controls Ltd. stand is the type No. 100 Perliter automatic igniter for overhead heaters. Hot wire igniter filaments of exceptional strength and heat resistance are interlinked with a magnetic valve in the gas supply to give a substantial measure of flame failure protection. The method of linking avoids overloading of the fialments so that the set operates for long periods between overhauls. Automatic controls may be wired into the circuit.

A full range of the equipment available from the combustion safeguard and solenoid valve division of **Ether Ltd.** is shown on an attractively laid-out stand. The company's range of solenoid valves is well-known, particularly the Type LPG which is specifically designed for use on low-pressure town gas installations. More recently, Ether Ltd. have developed this range to include models with a slow opening and slow closing characteristic (for which a patent has been applied). The time of opening and closing is easily adjusted as required by the operator, even after installation, and can be varied between zero and 15 seconds. It should be noted that the adjustment to closing is independent of the adjustment to opening. It is claimed that this valve will perform many of the duties which otherwise require the use of a motorised valve with the advantages of lower cost, dead-tight shut-off adjustment to opening and closing time and ease of servicing. Valves are available in this range in sizes of 1, 1½ and 2½ in.

Among the flame failure equipment on show on the Ether Ltd. stand are flame detectors, ignition and programme controllers for automatic burner control, photo-electric flame detection devices and boiler ignition units. Special reference should perhaps be made to the flame-trap ancillary Type 350 which protects flame-traps from the dangers of blow-back flames. This safeguard is particularly useful where pre-aerated gas or pre-mixed gases are used in industry. In the Type 350, there is a detector in front of the element in the flame-trap and within a fraction of a second of a blow-back, the supply of gas is cut off. If desired, a visual or audible alarm can be incorporated.

All types of automatic control and protection equipment are produced by **Teddington Industrial Equipment Ltd.,** including thermostats, solenoid and motorised valves, burner controls, automatic control panels, safety devices, relays and all types of control accessories. A good example of this company's equipment is the Type TJ pilot-flame safety device which is an automatic valve and pilot burner for the protection of gas-fired plant and appliances. By preventing gas flowing to the main burner until the pilot is properly alight and by shutting off the supply within 60 seconds of flame failure, the Type TJ eliminates the possibility of a dangerous explosion during lighting-up or from any subsequent failure of the pilot-flame.

Standard models of the Type TJ are provided with pilot ports, and in the event of flame failure both main and pilot gas supplies are cut off. For larger installations, where relay valves are necessary, the Type TJ device can be supplied without pilot ports as, in this case, the pilot must be fed from a separate supply. In this application only the main burner is shut off.

Flame-protection equipment is also a leading feature of the production of the well-known firm of **Sperryn & Co. Ltd.,** including thermo-electric and thermo-connective types

with sequenced automatic operation and ignition, as well as combined electric circuit and gas-safe control pilot units. The company also produces direct and indirect thermostatic controls and solenoid and manually-operated valves.

An important first showing on this stand is the Type G815 Flamemaster sequenced automatic flame control equipment for which a wide field of industrial applications is envisaged. In the event of gas failure, the probe cools, operates the solenoid valve and cuts down the main gas valve. Clock control is provided for the time factor and a thermostat for temperature control. The Type G815 also incorporates automatic ignition and has complete protection.

More complex gas-fired equipment requires a whole range of ancillary machinery including fans, compressors and the like. There were new developments in this field also. Shown for the first time on the Keith Blackman stand was the range of Aristocrat forward-curved centrifugal impellers which are particularly suitable for use with space heaters and unit air conditioners. An example from the actual fan range was also shown—a No. 15 size with direct-driven motor.

Well-known in the gas industry for many years is the firm of **W. C. Holmes & Co. Ltd.,** whose exhibits include equipment for the removal of liquid and solid particles from all types of carrier gases, grit and dust collection and, of course, the Holmes liquefied petroleum gas plant whose wide range of applications includes the provision of controlled atmospheres.

An example of the company's products is the Holmes-Schneible multi-wash system which is demonstrated by a working model. This system has a high efficiency, of the order of 99% for all particles above 3-4 microns. It has a lower pressure drop than many other types of wet washer and an absence of circuit restrictions which might cause blockages. In addition to the multi-wash collector itself, the complete standard system comprises fractionating or compensating exhaust hoods, velocitraps for removing heavier particles and dewatering tanks.

One of the most obvious ways of ensuring fuel efficiency is through heat recovery by means of the installation of an economiser. In this field, the firm of **Senior Economisers Ltd.** has an enviable position, their equipment having been installed in many works at home and overseas, including a number of important gasworks in the United Kingdom. At Olympia, the company show their complete range of economiser heating surface for medium and high pressures, the main feature being the familiar straight gas passage design.

Much has been said in recent times about the importance of adequate insulation as a means towards fuel efficiency and a number of firms specialising in the production of insulation materials are present at the Exhibition, including the **Cape Asbestos Company Ltd.,** whose products include Caposite amosite asbestos and Rocksil rock-wool moulded blocks and pipe sections as well as such other insulation accessories as asbestos yarn, cloth and rope lagging and asbestos plastic compositions. The Marinite asbestos sheet which is widely used for insulating purposes in gas-fired plant is made by **Marinite Ltd.,** a Cape Asbestos subsidiary. Asbestolux asbestos insulating board is manufactured by **Cape Building Products Ltd.,** another Cape subsidiary.

Refractories play an important part in the efficiency of many types of furnace and **Lafarge Aluminous Cement Co. Ltd.** make a special feature on their stand of the use of refractory and insulating concretes made from their products, Ciment Fondu aluminous cement and Secar 250 white calcium-aluminate cement. They point out that there is a pronounced increase in the use of castable refractories, particularly in water-tube boiler installations. The introduction of Secar 250 has enabled the company to offer castable refractories suitable for still higher duties.

Another very well-known company in this field is the **Morgan Crucible Co. Ltd.,** who show a selection of products at the Exhibition, including the Foliac range of jointing compouuds and greases and the Morganite carbon brushes, holders and carbon contacts for crane controllers and collectors. Perhaps their most interesting contribution, however, is the new range of Tri-mor mouldable, castable and gunning refractories.

Speedy and efficient cleaning of boiler tubes is an important aid to the efficiency of plant, and the **Consolidated Pneumatic Tool Co. Ltd.,** manufacturers of the Lagonda tube cleaners, show their complete range of this equipment which is capable of cleaning any size of tube from $\frac{3}{8}$ in. to 24 in., whether straight or curved.

Other exhibitors who are associated with the gas industry, are **British Stem Specialities, Charrington, Gardner & Locket, Clayton Son & Co., Davey Paxman, International Combustion, Maynall & Sons, Simon-Carves Ltd.** and **John Thompson.**

From this brief survey of the equipment on show at Olympia it is eviden that British firms can offer all the necessary means for the most effective use of all types of gas-fired installations, both domestic and industrial. The present need to cut costs provides an incentive to users of plant to seek out and install the most efficient equipment. If they need advice on the problems involved they can call either upon the technical services of the manufacturers of equipment or on a body such as the National Industrial Fuel Efficiency Service (N.I.F.E.S.) which is at present serving some 3,500 factories in the United Kingdom and claims that its heat and power surveys have revealed a potential annual saving of over 20% in a wide range of different industries.

World literature summary

ALL those connected with the use and production of fuel, especially research workers, will be interested to hear that the Institute of Fuel has announced the issue in the near future of a new periodical *Fuel Abstracts and Current Titles* a monthly summary of world literature on all scientific and technical aspects of fuel and power.

As a development to the abstracts originally prepared by the department of Scientific and Industrial Research, which ceased publication in December, 1958, the new venture will fill a widely felt gap as a work of reference particularly to those engaged in fuel technology and many technical applications of fuel in industry.

The sources of information to be called upon for compiling it, will include the principal research organisations, certain professional bodies and important industrial organisations concerned with fuel. These bodies will be putting their own information and abstracts' bulletins, often in proof form, at the disposal of the Institute and selections will be made from these sources to provide a comprehensive and relevant document. In addition the Institute are inviting corresponding members in other countries overseas to submit abstracts of original material appearing in their own countries.

Obtainable from May 15, 1960, onwards, from the Institute of Fuel, 18, Devonshire Street, Portland Place, London, W.1, *Fuel Abstracts and Current Titles* is available at a cost of 25s. per copy—the yearly index costs 35s.—or at a yearly subscription of 12 guineas which includes postage. A special edition printed on one side of the paper only costs 15 guineas.

H.P. BLOW FOR GAS

Cookers, room heaters, fridges likely to be most affected

NEWS SUPPLEMENT

SALES of several types of gas appliances are likely to be severely affected by the new hire-purchase restrictions announced by the Chancellor last week. Included in the 20% deposit and two-year maximum payment classification are space heaters, drying cabinets, washing machines and refrigerators of less than 12 cu.ft. capacity.

Water heaters, cookers, wash boilers and coppers and other appliances designed for gas or electricity heating but not operated by them, now require a 10% deposit and a maximum four year payment period.

Under the hiring order, advance payment of all rentals and charges payable in respect of the first three months is required. The hiring (rebates) order is designed to reinforce the hire-purchase restrictions. It applies to the goods covered by the hire-purchase order and prohibits a certain form of rental agreement which provides for the payment of rebates.

One London gas board has expressed the view that the new squeeze may be expected to give cooker sales a setback of perhaps 15-20%, but refrigerator sales may not be greatly affected. The effect on sales of room heaters, particularly the more expensive variety, may well be serious. It is thought that the restrictions may provide some boost to wash boiler sales, although this is likely to be much less pronounced than in 1955-56.

Central heating installations arranged under personal loan schemes are unaffected. This means that sales of oil boilers through dealers will continue as before. In the circumstances the organisation of a national gas scheme through a finance house becomes imperative. As reported last week, the North Western Gas Board, has already launched its own scheme.

The *Financial Times* described the actions to restrict the growth of credit as a logical sequence to the Budget and claimed that the measures taken amount to a definite but moderate check to the rise in spending, with the accent on consumer goods.

'Unavoidable'

The Times, in a leader, said that the measures were the least that the business world had come to expect. *The Guardian* agreed that 'some restriction of private credit was unavoidable,' and summed up by stating: 'One can argue whether Mr. Amory has chosen the best instruments; but at least he has shown that he is willing to act in good time to prevent the boom from getting out of hand.'

The opinion of the Federation of British Industries, as reported in *The Times*, was that they supported the move because prevention of inflation had to take overriding priority.

Dalton Main shut down

The Dalton Main coking plant in the North Eastern Division of the National Coal Board is to be closed as part of the policy to bring coke production more into balance with demand. Coke has been produced at Dalton Main since 1905 and the production in 1959 was 93,000 tons.

Summer prices for hard coke start this week

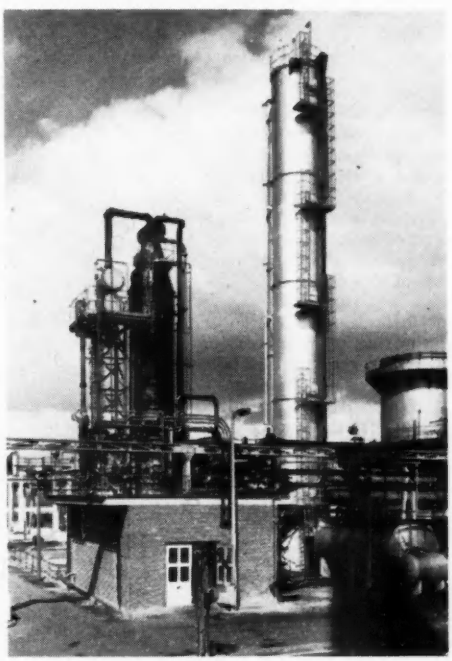
HARD coke summer prices to merchants came into operation on May 1. In the Midlands and North of England, in Scotland and in north and mid-Wales, the reduction will be 15s. per ton, and will apply until September 30. In the South of England, the reduction will be 21s. 8d. per ton until July 31, and 6s. 8d. per ton from August 1 to October 31.

BENZOLE PLANT BUILT IN EIGHT MONTHS

THE whole of the work, from drawing board to commissioning, involved in the construction of the benzole recovery and desulphurising plant at the Isle of Grain works of the South Eastern Gas Board was carried out by the chemical engineering division of W. C. Holmes & Co. Ltd. in just under eight months.

Segas process

The plant, which has a daily capacity of 16 mill. cu.ft. of gas, operates on gas produced by the Segas process and is installed immediately after the dry purification plant. It operates on the well-known oil circulation system using vacuum distillation of the oil. The merits of the system are that it maintains the circulating oil in good condition more or less indefinitely, and that it is extremely economical in steam.



The benzole recovery and desulphurisation plant at the Isle of Grain works.

Features

An interesting feature is the inclusion of a naphthalene stripping section, in the main vacuum still, which deals with the oil from a naphthalene washer on another part of the plant. A further feature is the use of a steam jet vacuum pump as a stand-by to the main rotary vacuum pump.

This plant is one of 47 vacuum benzole or desulphurising plants designed and constructed by the chemical engineering division of W. C. Holmes & Co. Ltd.

R. & A. Main's Falkirk factory modernises

WORKS CLEANER, PRODUCTION UP SINCE RESTYLING

MAJOR changes in factory layout carried out at the Gothic Works, Falkirk, of R. & A. Main Ltd., have now been completed. Within the G. & M Group this factory is responsible for all fire production, part of the company's cooker production and the bulk of its catering equipment requirements.

A section of the welding shop, which has 18 spot-welding machines, in addition to some orthodox oxy-acetylene equipment. Argonarc apparatus has been installed to facilitate the welding of stainless steel.

Re-styling has achieved three objects; increased productive capacity, an orderly, easily-controlled flow of materials, and a cleaner, evenly-heated and more pleasant factory. The works is now divided into four workshop groups, the first of which is the cast iron group.

The pattern shop, an all important section of this group, produces domestic burners, pot supports and gas rails.

For the casting of hollow units, such as the mixing tubes of burners and the gas ways of gas rails, sand cores have to be made around which the molten metal flows in the casting operation.

The foundry itself is worked as a floor foundry, with the moulding boxes being made up and rammed by hand. From the foundry, castings are taken to the adjoining dressing and fettling shop for cleaning, then on to the castings passing shop, where gas-carrying components are inspected and tested for soundness. From here the castings are passed to the machine shop.

The machine shop, which has only recently been revised in layout, carries out all machinery operations necessary on castings, the most commonly performed being the drilling of burner ports in hotplate, grill and oven burners. There are also heavier machines for the planing of castings, as for instance, the solid hotplates of catering appliances.

For castings that are not subsequently to be given a decorative finish the machine shop houses what is commonly referred to in the factory as the 'Big Dipper' for the black painting of these castings.

The pressed sheet iron group incorporates one of the largest and best equipped press shops in Scotland. Many components have to pass through six pressing operations before the final shape is attained. The welding together of components into sub-assemblies is carried out within the press shop.

The factory's finishing group comprises electroplating, painting and vitreous-enamelling shops.

In the electroplating shop, oven grid shelves, fire guards and other pieces of trim are given their protective and decorative coatings. Components to be plated are first cleaned, then plated in one of the three nickel-plating vats. Continuous research and experimental work has been carried out to establish which of the available nickel-plating solutions is the most successful, and to determine the best means of operation of the tanks.

In the painting shop, such components as fire fronts are given their decorative finishes. The enamelling shop, after the foundry, is possibly the most interesting shop in the factory. An enamel of high thermal shock resistance is essential on the hotplates of cookers, where splashes of cold water are likely to fall on hot enamel surfaces. Other enamels are chosen for their resistance to acids derived from fruits and foods, and others for their resistance to sulphuric acid since, alas, coal gases produced in this country still contain sulphur compounds.

The factory's assembly group is subdivided into a domestic sub-assembly section, a domestic cooker assembly, a domestic fire assembly, a catering appliance assembly, and for the final operation in manufacture, the testing and packing sections. The assembling of plate racks, the fitting of gas taps to gas

(Continued on opposite page)

A corner of the press shop, which contains 45 presses, varying in capacity from five to 400 tons, capable of up to four simultaneous operations.

The Gothic Works will be visited by delegates to the forthcoming conference of the Institution of Gas Engineers.

Tonnage oxygen plants for Fife

TWO tonnage oxygen plants are now being installed at Westfield, Fife, where the Scottish Gas Board are establishing Britain's first Lurgi pressure-gasification plant.

Designed and built by British Oxygen Engineering, Ltd., the £¼-mill. oxygen plants are scheduled to go into production at the end of this summer. The plants operate on the Tonnox internal compression system and have a combined output of 200 tons a day.

R. & A. Main's factory—from p.188

rails or Bray jets into gas fire burners, the cutting and folding of Rocksil and aluminium blankets for cooker insulation are examples of the work undertaken by the sub-assembly section.

Once fitting is completed each appliance is thoroughly tested before packaging. Co-ordinating all stages of manufacture and with the responsibility for the inspection and testing of all components and assemblies is the quality control department. In the background are the design and research departments which, in Falkirk, specialise in the development of catering appliances.

Big air-lift of gas cookers

Distributors in Dublin, Belfast, Jersey and the Isle of Man are now receiving their supplies of gas cookers by air. The big air-lift of cookers, which began just after Christmas, has already involved 30 trips to Dublin alone and it is planned to continue this form of delivery for the future. Three days a week an Everall Aviation DC.3, on charter to Skycraft of Dublin, carries a load of cookers each trip for the Birmingham factory of Radiation Ltd.

Control a constant pressure of hot water . . .

Applied to an instantaneous water heater, an Evered ½" Water Governor maintains constant water pressure, and thus ensures that water temperature does not alter with varying supply pressure. For this reason it is being used increasingly on heaters supplying Shower Baths, in Schools, Sports Clubs and Pit Head Baths. The Governor is spring loaded and may be mounted in any position in the cold water supply. It will control flow over the range ¼ to 5 gall. per min. at any desired outlet pressure between 8 and 20 p.s.i. Tests are applied to each governor before despatch, for performance up to 150 p.s.i., and for soundness up to 300 p.s.i. supply pressure. **Send for illustrated leaflet**

. . . with the EVERED Water Governor

EVERED AND COMPANY LIMITED
Surrey Works, Smethwick 40, Staffs.
Established 1809.

PERSONAL NOTES

MR. H. R. HART, T.D., has been appointed Deputy Chairman of the Scottish Gas Board in succession to MR. D. D. BURNS, O.B.E., who retired on April 30. Mr. Hart has been a member of the Scottish Gas Board since February, 1958. He was commercial manager of the East Midlands Gas Board from 1949 and general manager of the Glasgow and Western Division of the Scottish Gas Board from 1956. MR. D. D. MELVIN has been re-appointed full-time Member of the Board of SIR DAVID MILNE has been appointed part-time Member of the Board. Sir David was permanent under-secretary of state for Scotland from 1946 until his retirement last year. LORD MATHERS retires from the Board, of which he has been a part-time member since 1952, on completion of his present term of office.

MR. RALPH CREDLAND has retired from the Board of Widnes Foundry & Engineering Co. Ltd., after serving 62 years with the Thos. W. Ward group of companies. In 1942 he was appointed assistant managing director at Widnes and in 1951 became joint managing director, a post he held until February, 1959, when he felt the need to take a less active part in the management. He remained on the Board in a consultative capacity.

MR. P. J. BUNKER has been appointed Senior Lecturer in Gas Engineering at the Royal Technical College, Salford. Mr. Bunker, who received his early training with the former Brighton, Hove and Worthing Gas Company was founder chief instructor of the East Midlands Gas Board area training centre, Long Eaton.

MR. F. A. JACKMAN of Carless, Capel & Leonard Ltd. and MR. W. E. CARTWRIGHT of Benzole Producers Ltd. have been elected President and Vice-President respectively of the National Benzole and Allied Products Association.

Long service

AN AWARD FROM AN OLD FRIEND

MR. BENJAMIN WELBOURN, a stoker at **Stamford** gasworks, recently received a gold watch, badge and certificate for 40 years' service. The presentation was made by Mr. Bernard Clarke, who became friends with him in 1927. Since those days Mr. Clarke has risen to the post of Divisional Manager of the East Midlands Gas Board.

A wrist watch and a silver-plated tea set were received by Mr. James V. Bartlett and Mr. Gilbert Swann respectively when they were recently honoured for their 25 years service to the gas industry by **Dearne Valley** District of the East Midlands Gas Board.

Speaking at a presentation ceremony at **Acton,** Dr. J. Burns, Deputy Chairman, North Thames Gas Board, referred to the family tradition of service with the board. Forty-six employees with forty years service received awards, and Dr. Burns said that most of them had sons, fathers, brothers or grandfathers who had worked for the concern.

Nearly 1,000 chiming clocks have been presented at ceremonies in **Liverpool, Birmingham, Luton,** and **London** to employees with more than 25 years' continuous service with the Radiation Group of Companies. Forming 9% of the total labour force, the 992 long-service employees, who qualify for membership of Radiation's 'Twenty-five' Club, jointly represent 35,000 years of work.

Showroom wins prize

The North Western Gas Board's showroom in Crewe Road, Sandbach, Cheshire, won the first prize of a certificate and cheque in the general section of a window dressing contest during the town's 'Shopping Week' held recently by Sandbach Chamber of Trade and Commerce.

Appointments follow reorganisation in Scottish Central Division

UNDER a scheme of reorganisation, which embraces the merging of distribution, service and sales departments under one manager, certain former groups in Central Division of the Scottish Gas Board are now being designated districts.

The following appointments have been made:

MR. R. E. SILLS, service and sales manager at Dunfermline, to be Assistant to the Divisional Service and Sales Manager of the Central Division, based at Perth; MR. A. WALKER, group distributing engineer at Dunfermline, to be District Manager, Dunfermline; MR. W. M. GLEDHILL, group service and sales manager, Alloa-Sterling, to be District Manager, Alloa-Sterling; MR. W. H. WOODING, distributing engineer, Alloa-Sterling, to be Assistant District Manager; MR. J. H. FULTON, group distributing engineer, Kirkcaldy and Leven groups, to be District Manager at Kirkcaldy; MR. D. MARSHALL, service and sales manager, Leven group, to have responsibility for distribution in Leven.

Mr. Sills was first employed by the Cardiff gas undertaking. He came to Scotland in 1957 as group manager at Kirkcaldy. Last year, he presented the winning paper: 'You, Me and Our Industry,' which brought the industry's sales circle trophy to Scotland for the first time.

COMING EVENTS

May 5.—EAST MIDLANDS G.C.C.: Nottingham Chamber of Commerce, Smithy Row, Nottingham. 11 a.m.

May 6.—NORTH OF ENGLAND SECTION I.G.E.: Keswick Hotel, Keswick. Annual general meeting and ladies' day. 11 a.m.

May 10.—INSTITUTION OF PLANT ENGINEERS: Engineers' Club, Albert Square, Manchester. 'The Application of New Materials to Plant Egineering,' by J. Leyland. 7.15 p.m.

May 11.—SOUTH WESTERN SECTION, I.G.E.: Visit to new technical college, Bath, followed by paper on technical education, by Alan H. Yates.

May 13.—COKE OVEN MANAGERS' ASSOCIATION, SOUTHERN SECTION: Park Hotel, Park Place, Cardiff. 'The Cooling of Coke Oven Gas,' by R. O. Richards and A. Taylor.

May 13.—MIDLAND JUNIORS: Botanical Gardens, Westbourne Road, Edgbaston, Birmingham. President's day, 12 p.m.

May 14.—EAST OF SCOTLAND JUNIORS: Kirkcaldy. Annual general meeting and paper on 'Personnel Welfare and Training in the Gas Industry in Scotland,' by B. Preston.

May 14.—YORKSHIRE JUNIORS: Manchester. Joint visit with Manchester Juniors to works of Hardmann & Holden, followed by paper on purification.

May 17.—LONDON AND SOUTHERN SECTION, I.G.E.: The Connaught Rooms, Great Queen Street, London, W.C.2. Annual luncheon and Chairman's address.

G.C.2 AT EXHIBITION

The Gas Council's stand at the Royal Society of Health Exhibition, Torquay, last month, was divided into eight parts in order to show a wide range of gas-fired equipment. A special feature of the display was the G.C.2 cooker, specially designed for use by handicapped people.

OBITUARY

MR. STUART JOHN YOUNG—a pioneer of the development of methane gas drainage at Point of Ayr Colliery—has died. For many years he was chief mining engineer at the colliery, and becoming assistant manager.

MR. CHARLES WILLIAM PENNINGTON, who was formerly the assistant manager of the Newbury, Berks, gasworks, has died aged 55. He had been an invalid for some years.

MR. GEORGE SAVAGE, East Midlands Gas Board manager at Corby, Northants, has died aged 49.